REMARKS

This Amendment is filed in response to the Office Action dated December 16, 2005, which has a shortened statutory period set to expire March 16, 2006.

Claims 1, 8, 14, 17, 18-21, and 24 Are Patentable Over Elliott

Claim 1, as amended, recites:

> an energy beam source for directing an energy beam at the contaminant layer during a localized cleaning operation, the energy beam being configured to heat only a small area of the contaminant layer until the small area is vaporized, thereby creating an opening in the contaminant layer; and
>
> a thin film analysis module for performing at least one of single wavelength ellipsometry (SWE), spectroscopic ellipsometry (SE), reflectometry, grazing incidence x-ray reflectometry (GXR), x-ray fluorescence (XRF), electron microprobe analysis (EMP), non-contact-based electrical analysis, and contact-based electrical analysis on the thin film through the opening in the contaminant layer.

Applicants respectfully submit that Elliott fails to teach how the energy beam source creates the opening in the contaminant layer as well as performing the analysis on the thin film. Specifically, Elliott teaches a technique in which "the entire surface of the substrate [is] passed beneath the illumination zone 468". Col. 22, lines 26-27. For this reason, Elliott frequently describes his technique as "surface cleaning". See, for example, col. 4, lines 14-15, 24-25; col. 6, lines 55-56; and col. 27, lines 22-23. Because Elliott teaches a bulk (total wafer) cleaning methodology, Elliott fails to teach a localized cleaning operation.

Moreover, Elliott teaches that to clean the surface of a substrate, a flow of a fluid including a reactant is directed at the contaminant layer. Col. 1, lines 44-47. To aid the reactant to react with the contaminant layer, a beam of

radiation is delivered. Col. 1, lines 47-50. In contrast, Applicants' invention uses the energy beam to heat only a small area of the contaminant layer until that small area is vaporized. Elliott fails to teach this recited use of the energy beam source.

Applicants respectfully submit that Elliott fails to teach the thin film analysis module. Verifying that a surface has been cleaned (e.g. col. 21, lines 31-33) has nothing to do with the analysis of the thin film that can be accessed via the hole created by the energy beam source.

Because Elliott fails to disclose or suggest multiple elements of Claim 1, Applicants request reconsideration and withdrawal of the rejection of Claim 1.

Claims 8, 14, 17-21, and 24 depend from Claim 1 and therefore are patentable for at least the reasons presented for Claim 1. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claims 8, 14, 17, 18-21, and 24.

Claims 9-13 And 15 Are Patentable Over Elliott In View Of Morris

Claims 9-13 and 15 depend from Claim 1 and therefore are patentable for at least the reasons presented for Claim 1. Morris fails to remedy the deficiency of Elliott with respect to Claim 1. Specifically, Morris teaches a laser light that can generate high precision through-cuts in a target material. Col. 1, lines 7-8. Thus, Morris also fails to teach how an energy beam source can create the opening in the contaminant layer as well as performing the analysis on the underlying thin film. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claims 9-13 and 15.

Claim 16 Is Patentable Over Elliott In View Of Haight

Claim 16 depends from Claim 1 and therefore is patentable for at least the reasons presented for Claim 1. Haight fails to remedy the deficiency of Elliott with respect to Claim 1. Specifically, Haight teaches focusing a laser beam above the surface of the material to be ablated. Col. 4, lines 36-43. Thus, Haight also fails to teach performing an analysis on an underlying thin film. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claim 16.

Claims 27, 33, 35-37, 41, 44, And 47 Are Patentable Over Elliott In View Of Fukuda

Claim 27, as amended, recites:

> during a localized cleaning operation, directing an energy beam at a first location on the contaminant layer while the test sample is on the stage, the energy beam heating only a small area of the contaminant layer until the small area is vaporized, thereby removing a first portion of the contaminant layer to create an opening in the contaminant layer to expose a first analysis area of the thin film; and
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> performing at least one of single wavelength ellipsometry (SWE), spectroscopic ellipsometry (SE), reflectometry, grazing incidence x-ray reflectometry (GXR), x-ray fluorescence (XRF), electron microprobe analysis (EMP), non-contact-based electrical analysis, and contact-based electrical analysis on the thin film at the first analysis area through the opening in the contaminant layer while the test sample is on the stage.

Applicants respectfully submit that Elliott fails to teach how the energy beam source creates the opening in the contaminant layer as well as performing the analysis on the thin film. Specifically, Elliott teaches a technique in which "the entire surface of the substrate [is] passed beneath the

illumination zone 468". Col. 22, lines 26-27. For this reason, Elliott frequently describes his technique as "surface cleaning". See, for example, col. 4, lines 14-15, 24-25; col. 6, lines 55-56; and col. 27, lines 22-23. Because Elliott teaches a bulk (total wafer) cleaning methodology, Elliott fails to teach localized cleaning.

Moreover, Elliott teaches that to clean the surface of a substrate, a flow of a fluid including a reactant is directed at the contaminant layer. Col. 1, lines 44-47. To aid the reactant to react with the contaminant layer, a beam of radiation is delivered. Col. 1, lines 47-50. In contrast, Applicants' invention uses the energy beam to heat only a small area of the contaminant layer until that area is vaporized. Elliott fails to teach this recited use of the energy beam source.

Applicants respectfully submit that Elliott fails to teach the thin film analysis module. Verifying that a surface has been cleaned (e.g. col. 21, lines 31-33) has nothing to do with the analysis of the thin film that can be accessed via the small hole created by the energy beam source.

Applicants submit that Fukuda fails to remedy the above-noted deficiencies of Elliot. Specifically, Fukuda teaches a plasma operation apparatus suitable for performing thin film deposition. Col. 1, lines 5-10. Thus, Fukuda also fails to teach how an energy beam source can create an opening in a contaminant layer as well as performing an analysis on an underlying thin film.

Because both Elliott and Fukuda fail to disclose or suggest multiple limitations of Claim 27, Applicants request reconsideration and withdrawal of the rejection of Claim 27.

Claims 33 and 35-37 depend from Claim 27 and therefore are patentable for at least the reasons presented for Claim 27.

Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claims 33 and 35-37.

Claim 41, as amended, recites:

> means for directing an energy beam at the contaminant layer during a localized cleaning operation, the energy beam heating only a small area of the contaminant layer until the small area is vaporized, thereby removing a portion of the contaminant layer to create an opening in the contaminant layer to expose an analysis area on the thin film; and
>
> means for performing at least one of single wavelength ellipsometry (SWE), spectroscopic ellipsometry (SE), reflectometry, grazing incidence x-ray reflectometry (GXR), x-ray fluorescence (XRF), electron microprobe analysis (EMP), non-contact-based electrical analysis, and contact-based electrical analysis on the thin film at the analysis area through the opening in the contaminant layer.

Therefore, Claim 41 is patentable for substantially the same reasons presented for Claim 27. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claim 41.

Claims 44 and 47 depend from Claim 41 and therefore are patentable for at least the reasons presented for Claim 41. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claims 44 and 47.

Claims 34 And 43 Are Patentable Over Elliot, Fukuda, And Morris

Claim 34 depends from Claim 27 and therefore is patentable for at least the reasons presented for Claim 27. Morris fails to remedy the deficiency of Elliot and Fukuda with respect to Claim 27. Specifically, Morris teaches a laser light that can generate high precision through-cuts in a target material. Col. 1, lines 7-8. Therefore, Applicants request reconsideration and withdrawal of the rejection of Claim 34.

Claim 43 depends from Claim 41 and therefore is patentable for at least the reasons presented for Claim 41. Morris fails to remedy the deficiency of Elliot and Fukuda with respect to Claim 41. Specifically, Morris teaches a laser light that can generate high precision through-cuts in a target material. Col. 1, lines 7-8. Therefore, Applicants request reconsideration and withdrawal of the rejection of Claim 43.

Claims 51 And 52 Are Patentable Over Livengood

Claim 51, as amended, recites:

> an energy beam source for directing an energy beam at the contaminant layer during a localized cleaning operation, the energy beam being configured to heat only a small area of the contaminant layer until the small are is vaporized, thereby remove a portion of the contaminant layer to expose an analysis area on the thin film; and
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> a thin film analysis module for measuring the thin film at the analysis area, wherein the thin film analysis module comprises a contact-based electrical analysis system.

Livengood teaches the selective removal of at least a portion of material in order to make electrical contact to underlying components or to an underlying doped semiconductor region. Col. 1, lines 17-23. Therefore, Livengood fails to teach anything about a localized cleaning operation of a contaminant layer.

Livengood further teaches using etching or milling equipment can be used for material removal. Col. 2, line 66 to col. 3, line 1. Livengood teaches that a laser ablation device could be used. Col. 3, lines 1-5. However, notably, Livengood teaches nothing about a thin film analysis module. FIG. 3, which is cited by the Office Action, shows a graph of the photocurrent or induced current amplitude versus thickness of a

semiconductor substrate material being etched/milled. Col. 4, lines 37-44. Thus, Livengood teaches when to stop etching/milling the substrate material, but teaches nothing about the analysis of an underlying thin film.

Because Livengood fails to disclose or suggest multiple limitations of Claim 51, Applicants request reconsideration and withdrawal of the rejection of Claim 51.

Claim 52, as amended, recites:

> during a localized cleaning operation, directing an energy beam at a first location on the contaminant layer while the test sample is on the stage, the energy beam heating only a small area of the contaminant layer until the small area is vaporized, thereby removing a first portion of the contaminant layer to expose a first analysis area of the thin film; and
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> measuring the thin film at the first analysis area while the test sample is on the stage, wherein measuring the thin film comprises performing a contact-based electrical analysis.

Therefore, Claim 52 is patentable for substantially the same reasons presented for Claim 51. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claim 52.

CONCLUSION

Claims 1, 8-21, 24, 27, 33-37, 41, 43, 44, 47, 51, and 52 are pending in the present application. Allowance of these claims is respectfully requested.

If there are any questions, please telephone the undersigned at (408) 451-5907 to expedite prosecution of this case.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service as FIRST CLASS MAIL in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on February 27, 2006.

2/27/2006
Date

Signature: Rebecca A. Baumann